IMPROVED DRYWALL JOINT AND SYSTEM AND PROCESS FOR MAKING

This is a continuation in part of U.S. Patent Application 10/731,324, filed December 9, 2003, which in turn is a continuation U.S. Patent Application 10/144,515, filed May 13, 2002, of the entire disclosures of which are hereby incorporated as if set forth fully herein.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to the field of architecture and construction. More specifically, this invention relates to the field of drywall construction, which is the most common method that is used today to finish interior walls and ceilings in buildings such as new homes and offices.

2. Description of the Related Technology

Conventional drywall is fabricated in sheets having a gypsum core that is contained within a fibrous, cardboard-like outer skin. Drywall sheets typically are approximately four feet to in width by eight feet in height, although this may vary depending upon the manufacturer and the part of the world in which the product is being used.

Conventional frame-type construction involves assembling the structural portion of a wall or ceiling from a framework that is constructed of a plurality of joists, which are typically 2x4 pieces of lumber. The drywall must be fastened over the framework of joists to form the outer surface of the wall or ceiling. Since a number of drywall sheets will usually have to be applied to a particular wall or ceiling surface to completely cover the structural framework of the wall or the

ceiling, the individual sheets of drywall will have to be joined together in a way that is not easily detectable to a viewer after the wall has been finished.

FIGURE 1 depicts a conventional drywall joint 10 that is the most typical example of the current state of construction in this area. As shown in FIGURE 1, a first drywall sheet 12 is positioned end-to-end with a second drywall sheet 14, with adjacent edges of the two sheets 12, 14 positioned together in a butt-type interface 16. Because of the irregularities that are unavoidable in joist-type construction, it is considered preferable to have the butt interfaces 16 between the different sheets of drywall positioned over an open area within the structural framework, and not directly over one of the joists. Instead, a support member 18 is positioned behind the two drywall sheets 12, 14 in order to provide rigidity to the joint and give alignment to the drywall sheets 12, 14 during the joining process. As FIGURE 1 shows, the drywall sheets are first joined to the support member 18 by a pair of drywall screws 20, 22. After the drywall screws 20, 22 have been so secured, a second pair of screws 24, 26, which are closer to the butt interface 16, are then inserted and secured between the support member 18 and the respective drywall sheets 12, 14.

At this point, the first and second drywall sheets 12, 14 are joined together structurally, but are still aesthetically quite distinguishable. To hide the visible crack of the butt interface 16, a length of adhesive mesh drywall joint tape 28 is applied to the crack at the butt interface 16, and a substance that is known as joint compound 30, or more commonly by the term "mud," is trowled on top of the tape 28 and is spread as smoothly as possible outwardly over the exterior surface of the two drywall sheets 12, 14 so as to disguise the joint 10 from view as effectively as possible.

Unfortunately, the added thickness of the joint tape 28 and the joint compound 30 creates a bulge 32 at the conventional drywall joint 10. A skillful contractor will be able to disguise the bulge 32 as well as it can be disguised, mainly by spreading the joint compound outwardly for some distance, but there are some instances in which the bulge 32 will remain noticeable, such as

when there is overhead spot lighting that will strike the bulge 32 obliquely, which will tend to make the bold 32 very evident to even the least discerning viewers.

In addition to the disadvantages of the conventional drywall joint 10 that are discussed above, it takes a great amount of time and material to smooth the conventional drywall joint 10 when one considers the number of such joints that will have to be made in the construction of a large building such as a house.

A need exists for an improved drywall joint and a system and process for making such a joint that will reduce the amount of labor and materials necessary to form the joint, and that will enhance the aesthetic value of the finished joint.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the invention to provide an improved drywall joint and a system and process for making such a joint that will reduce the amount of labor and materials necessary to form the joint, and that will enhance the aesthetic value of the finished joint.

In order to achieve the above and other objects of the invention, a method of making a drywall joint according to a first aspect of the invention includes steps of positioning a flexible butt block that has a recessed surface on an interior side of a joint that is to be formed between a first drywall sheet and a second drywall sheet, wherein the flexible butt block has a leg portion and a lever point. Securing at least one of the first and second drywall sheets to the flexible butt block so that the secured sheet is made to conform in shape to the recessed surface, thereby forming a secondary recess on an exterior of the drywall sheet in the area at which the joint is to be made. Applying joint compound within the secondary recess.

According to a second aspect of the invention, a flexible butt block for forming a drywall joint. The flexible butt block has a first surface for engaging a first sheet of drywall. The flexible butt block has a second surface for engaging a second sheet of drywall. The flexible butt block has a first leg portion located at a first distal end of the flexible butt block for engaging a

first sheet of drywall. The flexible butt block has a second leg portion located at a second distal end of the flexible butt block for engaging a second sheet of drywall.

According to a third aspect of the invention, a drywall joint having a first sheet of drywall having a first butt edge. The drywall joint has a second sheet of drywall having a second butt edge, the first and second sheets of drywall being positioned so that said first butt edge is adjacent to said second butt edge at a butt interface. The drywall joint further has recess forming means engaging the first and second sheets for pulling the first and second butt edges towards first and second leg portions and first and second surfaces located on a flexible butt block so as to define a secondary recess in exterior surfaces of the first and second sheets in the area of the butt interface and a sealant applied in the secondary recess.

These and various other advantages and features of novelty that characterize the invention are pointed out with particularity in the claims annexed hereto and forming a part hereof. However, for a better understanding of the invention, its advantages, and the objects obtained by its use, reference should be made to the drawings which form a further part hereof, and to the accompanying descriptive matter, in which there is illustrated and described a preferred embodiment of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a fragmentary cross-sectional view depicting a conventional drywall joint;

FIGURE 2 is a perspective view of a butt block that is constructed according to a preferred embodiment of the invention;

FIGURE 3 is a fragmentary cross-sectional view depicting a first method step in a process that is performed according to a preferred embodiment of the invention;

FIGURE 4 is a fragmentary cross-sectional view depicting a second method step in the process that is first shown in FIGURE 3; and

FIGURE 5 is a fragmentary cross-sectional view depicting a completed joint that is constructed according to a preferred embodiment of the invention;

FIGURE 6 is a frontal view of the flexible butt block;

FIGURE 7 is a fragmentary cross-sectional view depicting a first method step in a process that is performed using the flexible butt block;

FIGURE 8 is a fragmentary cross-sectional view depicting a second method step of the process shown in FIGURE 7 using the flexible butt block;

FIGURE 9 is fragmentary cross-sectional view depicting a completed joint that is constructed using the flexible butt block.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

Referring now to the drawings, wherein like reference numerals designate corresponding structure throughout the views, and referring in particular to FIGURE 2, a butt block 40 constructed according to a preferred embodiment of the invention includes a first outboard flange 42 and a second outboard flange 44. As may be seen in FIGURE 2, the first outboard flange 42 includes a first surface 46 defined by a forward portion of the flange 42. The second flange 44 likewise is provided with a second surface 48 on a front portion thereof. The purpose of first and second surfaces 46, 48 is to engage the interior surfaces of first and second sheets of drywall 12, 14, as will be described in greater detail below. The first and second surfaces 46, 48 are substantially planar, and preferably lie within substantially the same plane.

Referring again to FIGURE 2, it will be seen that butt block 40 further includes recess defining structure 50 that is embodied as a first recessed panel 52, and a second recessed panel 54. The recessed panels 52, 54 are unitary with each other and are joined at a center axis 56 that is located at the innermost point of the recess that is defined by the recess defining structure 50. The first recessed panel 52 is unitary with the first flange 42, while the second recessed panel 54 is similarly unitary with the second flange 44. The butt block 40 is fabricated from a material that is capable of being penetrated by a standard drywall screw, and that is traditionally capable of entering such screws to the extent necessary to perform the steps that are described with reference to FIGURES 3,4 and 5 below. In the preferred embodiment, this material is fiberglass.

Referring now to FIGURE 3, a method of making an improved drywall joint according to a preferred embodiment of the invention will now be described. As FIGURE 3 shows, the butt block 40 that has been described in reference to FIGURE 2 is cut to an appropriate length, and is then positioned behind first and second drywall sheets 12, 14 that are desired to be joined. This is in most cases performed so that the butt block 40 will be positioned in a void that is defined by adjacent joists within a framework for a wall or a ceiling. The butt block 40 is preferably positioned, as shown in FIGURE 3, so that the center axis 56 is substantially aligned with the butt interface 16 between the edges of the drywall sheets 12, 14 that are to be joined. This alignment may be accomplished by temporarily placing a number of drywall screws into the butt block 40 along the center axis 56 and then sliding the butt block 40 behind one of the drywall sheets 12, 14 until these temporarily set drywall screws abut the edge of the drywall sheets 12, 14.

As FIGURE 3 shows, a first series of drywall screws 60 are used to secure the first flange 42 of the butt block 40 to a portion of the first drywall sheet 12 that is located some distance from the butt interface 16. Immediately thereafter, a second series of drywall screws 62 are similarly driven into the second drywall sheet 14 to secure a corresponding portion of the sheet 14 to the second flange 44 of the butt block 40. These actions cause the first and second surfaces 46, 48 that are described in reference to FIGURE 2 to be drawn tightly against interior surfaces 68, 70 of the respective sheets 12, 14.

At this point in time, the exterior surfaces 64, 66 of the respective drywall sheets 12, 14 are substantially aligned with each other in substantially the same plane as the rest of the drywall sheets 12, 14, much in the manner as is shown in the conventional joint that is depicted in FIGURE 1.

Referring now to FIGURE 4, the preferred embodiment of the invention further includes steps of driving a third series of screws 74 into portions of the first drywall sheet to 12 that are fairly close to the butt interface 16. At about the same time, a fourth series of screws 76 are driven into portions of the second drywall sheet 14 that are fairly close to the butt interface

16. As the screws 74, 76 are tightened, the area of the drywall sheets 12, 14 that are adjacent to the butt interface 16 are drawn into the recess 72 that is defined by the recess defining structure 50 in the butt block 40, thereby creating a secondary recess 78 to be formed on the exterior surface of the joint. In other words, the exterior surfaces 64, 66 of the drywall sheets 12, 14 become pitched inwardly toward the butt interface 16, as is clearly shown in FIGURE 4.

Looking now to FIGURE 5, the secondary recess 78 that is shown in FIGURE 4 will now be filled by a process that includes applying an adhesive mesh joint tape that is of conventional construction over the butt interface 16, and then applying a joint compound 82 to fill the rest of the secondary recess 78. This is preferably performed so that the resulting joint 86 has a planar exterior surface that lies within the same plane 84 as the main portions of the first and second sheets 12, 14 of drywall.

Referring now to FIGURE 6, a preferred embodiment of the invention using flexible butt block 140 is shown. Flexible butt block 140 provides excellent flexibility so that it has more versatility when forming a recess and further creates a well-defined recess that runs the length of the joint.

In forming the recess, drywall 14 is attached to stud 190 with exterior surfaces 64 and 66 facing out. Flexible butt block 140 is positioned behind drywall 14 facing interior surfaces 68 and 70. Flexible butt block 140 is attached at screw reception areas 172 located on leg portion 159 using first set of drywall screws 139. This insures that drywall butt 182 is in line with central axis 156 of flexible butt block 140. Drywall 12 is then attached to stud 192. Drywall butts 181 and 182 form butt interface 16 and are aligned with central axis 156 of flexible butt block 140. Drywall 12 is then attached to the flexible butt block 140 at screw reception areas 174 located on leg portion 157 using second set of drywall screws 138. Leg portions 157 and 159 assist in providing easy attachment of flexible butt block 140 to drywall 14 and drywall 12.

Drywall 14 is then attached to flexible butt block 140 at approximately 3/8 of an inch from drywall butt 182 with drywall screws 137. Drywall 12 is attached to flexible butt block 140 at approximately 3/8 of an inch from drywall butt 181. Drywall 14 is drawn towards central axis

156 via the action of third set of drywall screws 137 being attached at screw reception areas 132, thereby creating a force of approximately 65 PSI (PSI figures are based on 5/8 inch of Sheetrock™ (drywall)). Drywall 12 is drawn towards central axis 156 via the action of fourth set of drywall screws 136 being attached at screw reception areas 130, thereby creating a force of approximately 65 PSI. A force greater than the PSI created by the attachment of sets of screws 137 and 136, is created at lever points 155 and 153, forcing leg portions 159 and 157 to follow the upward recesses. Lever points 155 and 153 are designed to be more flexible than central axis 156. At the ends of leg portions 157 and 159, rounded portions 160 and 162 serve to provide clearance during the attachment of flexible butt block 140 and after attachment of flexible butt block 140. Rounded portions 160 and 162 also assist in the lever action.

Flexible butt block 140 is designed to collapse downwards at central axis 156 by approximately 1/32 of an inch, although this distance can vary, or until a force greater than the 65 PSI created via the action of sets of drywall screws 137 and 136 being placed within screw reception areas 132 and 130, respectively, thereby creating a lever effect at lever points 155 and 153. Rounded portions 160 and 162 facilitate the lever effect. The effect of the lever action helps to secure flexible butt block 140 to drywall 14 and drywall 12 and creates a well-defined recess formed by exterior surfaces 64 and 66.

Testing has found that recessed panels 152 and 154 of flexible butt block 140 formed left and right of central axis 156 operate with the same lever effect but independent of each other. Total collapse of flexible butt block 140 at central axis 156 could not be achieved at 200 PSI well over the amount of PSI created via the action of sets of drywall screws 136, 137, 138, and 139 on central axis 156 (approximately 130 PSI at central axis 156), upward lever effect at lever points 155 and 153 was approximately 160 PSI. These pressures will change depending on the gauge of the drywall used.

FIGURE 7 shows flexible butt block 140 in position before sets of drywall screws 136, 137, 138, and 139 are attached. Flexible butt block 140 is placed adjacent drywall 12 and drywall 14. Central axis 156 of flexible butt block 140 is aligned with butt interface 16. Sets of

drywall screws 136, 137, 138, and 139 are placed in position to be attached to screw reception areas 130, 132, 172, and 174.

FIGURE 8 shows flexible butt block 140 attached to drywall 12 and drywall 14. Screw sets 138 and 139 are first attached to screw reception areas 174 and 172 thereby drawing drywall 12 and drywall 14 towards leg portions 157 and 159.At this point the angle measured from central axis 156 to the surface of flexible butt block 140 between central axis 156 and lever point 153 is roughly 3.5°. The angle measured from central axis 156 to the surface of flexible butt block 140 between central axis and lever point 155 is roughly 3.5°. Also at this point in time the angle measured from the surface of drywall 12 and drywall 14 to the bottom of leg portions 157 and 159 is roughly 0°.

Sets of drywall screws 136 and 137 are then attached to screw reception areas 130 and 132. The attachment of sets of drywall screws 136 and 137 draw drywall 12 and drywall 14 towards flexible butt block 140 and additionally causes force to be applied via the action of lever points 153 and 155 and the flexibility of leg portions 157 and 159 enhanced by rounded portions 160 and 162. The force generated by the action of lever points 153 and 155 further presses central axis 156 towards drywall 12 and drywall 14. After the lever action, the angle measured from central axis 156 to the surface of flexible butt block 140 between central axis 156 and lever point 153 is roughly 3.0°. The angle measured from central axis 156 to the surface of flexible butt block 140 between central axis and lever point 155 is roughly 3.0°. Also at this point in time the angle measured from the surface of drywall 12 and drywall 14 to the bottom of leg portions 157 and 159 is roughly 2.0°.

The lever action helps secure drywall 12 and drywall 14 to flexible butt block 140, and further assists in creating a well defined recess formed by exterior surfaces 64 and 66 of drywall 12 and drywall 14. The recess formed by exterior surfaces 64 and 66, shown in FIGURES 8 and 9, as well as the V gap formed below central axis 156 shown in FIGURES 8 and 9, are exaggerated in order to illustrate the invention. The recess formed by exterior surfaces 64 and 66, is 3/32 inches deep before the lever action at lever points 153 and 155 when measured from

the interface of exterior surfaces 64 and 66 to a point substantially parallel with the remaineder of the main portions of the first and second sheets 12, 14 of drywall, and is 1/16 inches or less deep after the lever action of lever points

FIGURE 9 shows the final step in forming the joint. An adhesive mesh joint tape that is of conventional construction, preferably having a thickness of .008 inches and roughly 2 inches wide, is applied over the butt interface 16, and then a joint compound 82 is used to fill the recess created by attaching flexible butt block 140. This is preferably performed so that the resulting joint has a planar exterior surface that lies within the same planes as the main portions of the first and second sheets 12, 14 of drywall. When drywall compound 82 and tape are applied to butt interface 16, the water in the joint compound 82 weakens first and second sheets 12 and 14 of drywall and first and second sheets 12 and 14 of drywall will retain their new shape when dry. This further conforms drywall sheets 12 and 14 to the butt block 140.

The material most ideal for the construction of flexible butt block 140 was found to be fiberglass, however other materials, such as metal or wood can be used. Fiberglass is superior in screw retention and when it comes to keeping its physical properties with heat. It will hold its shape at temperatures greater than 170 °F and is not negatively affected by cold. Fiberglass will try to reform its shape.

It is to be understood, however, that even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, the disclosure is illustrative only, and changes may be made in detail, especially in matters of shape, size and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.